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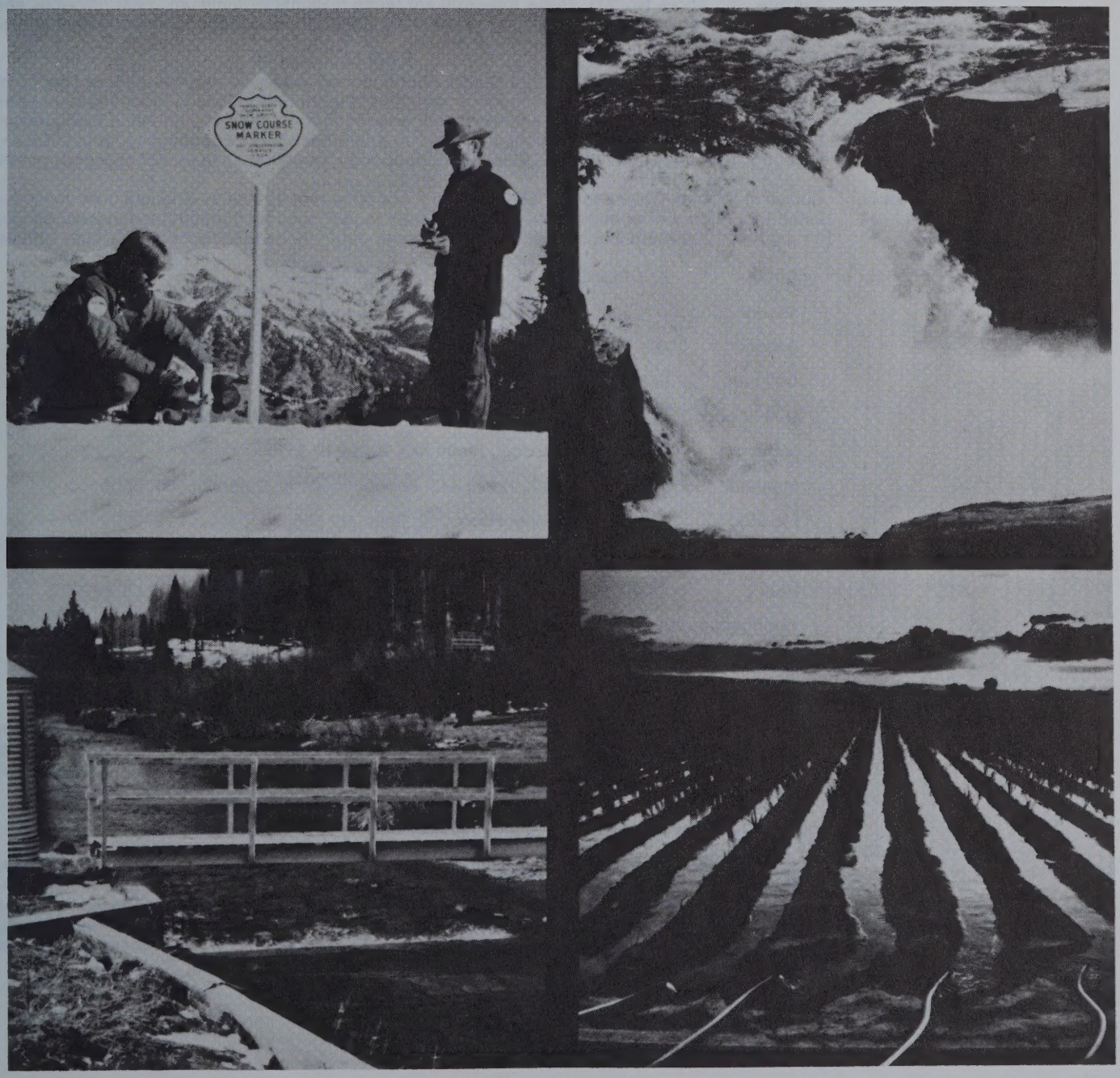
United States
Department of
Agriculture

**Soil
Conservation
Service**

**Bozeman,
Montana**

Montana Water Supply Outlook

June 1, 1988



Foreword

How Forecasts Are Made

Most of the annual streamflow in the Western United States originates as snowfall. This snowfall accumulates high in the mountains during winter and early spring. As the snowpack accumulates, hydrologists estimate the runoff that will occur when it melts. Predictions are based on careful measurements of snow water equivalent at selected index points. Precipitation, temperature, soil moisture and antecedent streamflow data are viewed in conjunction with snowpack data to prepare runoff forecasts. This report presents a comprehensive picture of water supply outlook conditions for areas dependent upon surface runoff. It includes selected streamflow forecasts, summarized snowpack and precipitation data, reservoir storage data and narratives describing current conditions.

Streamflow forecasts are cooperatively generated by Soil Conservation Service and National Weather Service hydrologists. Forecasts become more accurate as more data affecting runoff becomes known. For this reason, forecasts are issued that reflect three future precipitation conditions — Below Normal, Average, and Above Normal. These forecasts are terms reasonable minimum, most probable, and reasonable maximum. Actual streamflow can be expected to fall between the lower and upper forecast values eight out of ten years.

Snowpack data are obtained by using a combination of manual and automated measurement methods. Manual readings of snow depth and water equivalent are taken at locations called snow courses on a monthly or semi-monthly schedule during the winter. In addition, snow water equivalent, precipitation, temperature, and other parameters are monitored on a daily basis and transmitted via radio telemetry to central data collection facilities. Both monthly and daily data are used to project snowmelt runoff.

For More Information

Copies of Monthly Water Supply Outlook Reports and other reports may be obtained from the states listed below. An annual snow survey data summary is published by the Soil Conservation Service for each of the western states. Historical snow survey data may be obtained at those same offices.

STATE	ADDRESS
Alaska	201 East 9th Ave., Suite 300, Anchorage, AK 99501-3687
Arizona	201 East Indianola, Suite 200, Phoenix, AZ 85012
Colorado	2490 West 26th Ave., Denver, CO 80211
New Mexico	517 Gold Ave. S.W., Room 3301, Albuquerque, NM 87102-3157
Idaho	304 North 8th Street, Room 345, Boise, ID 83702
Montana	10 East Babcock, Room 443, Federal Building, Bozeman, MT 59715
Nevada	1201 Terminal Way, Room 219, Reno, NV 89502
Oregon	1220 Southwest 3rd Ave., Room 1640, Portland, OR 97204
Utah	4402 Federal Building, 125 South State Street, Salt Lake City, UT 84147
Washington	360 U.S. Court House, Spokane, WA 99201-1080
Wyoming	Federal Building, 100 East "B" Street, Casper, WY 82601

In addition to state reports, a Water Supply Outlook for the Western United States is published by the Soil Conservation Service and National Weather Service monthly, January through May. Reports may be obtained from the Soil Conservation Service, West National Technical Center, 511 Northwest Broadway, Room 248, Portland, OR 97209.

Published by other agencies:

Water Supply Outlook Reports prepared by other agencies include: California — Snow Survey Branch, California Department of Water Resouces, P.O. Box 388, Sacramento, CA 95802; British Columbia — The Ministry of Environment, Water Investigations Branch, Parliament Buildings, Victoria, British Columbia, V8V 1X5; Yukon Territory — Department of Indian and Northern Affairs, Northern Operations Branch, 200 Range Road, Whitehorse, Yukon Territory, Y1A 3V1; Alberta, Environment Technical Services Division, 9820 106th St., Edmonton, Alberta T5K 2J6.

Montana
Water Supply Outlook

and

Federal – State – Private
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Programs and assistance of the United States Department of Agriculture are available without regard to race, creed, color, sex, age, or national origin.

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General Outlook

Some areas in Montana will be facing shortages of water supplies for irrigation and other uses later this season. Contact your local Soil Conservation Service office for current snowpack and precipitation data and for assistance in operating with a reduced water supply

Summary

Snowpacks are well below average for this time of year but better than a year ago. Only the higher elevations continue to hold snow. Mountain precipitation was below average over most of the State in May. However, there was a band of near average moisture from the Yellowstone Headwaters to the northwest corner. Some areas around Red Lodge and Bozeman had above average amounts. Most streams have reached peak snowmelt runoff. In general, those streams west of the Divide recorded highest flows near mid-May. Southwest streams, those in central Montana, and northern central, east slope streams generally peaked about the same time as west side streams. The Big Hole, Gallatin and Bitterroot Rivers were near the end the month with the Yellowstone and most of its tributaries expected to reach highest flows in early June. May runoff varied from above average on the Yellowstone and Gallatin Rivers to below average on other streams. Most had runoff in the 50 to 80 percent of average range. Seasonal streamflow is expected to be a little less than forecasted on May 1 on most streams. On streams with lower elevation headwaters, irrigation water shortages are expected to develop by mid to late June. Higher elevation headwater streams should have adequate supplies into early or mid-July.

Snowpack

Snowpack levels are well below average in most basins. Only the higher elevations continue to have snow. In these areas the water content of the snow is less than one-half of normal amounts. Some areas experienced daily melt rates of near 2 inches of water content in early June. Nearly all measuring sites will be bare by mid-June.

Precipitation

May mountain precipitation was about average for the area across the Yellowstone River Headwaters, Middle Gallatin, Big Hole, Upper Clark Fork and Bitterroot and portions of the Kootenai and Flathead River Drainages. The southwest corners and areas north and east of this band received below to well below average moisture for the month. The only areas reporting above average precipitation were south of Bozeman in the Hyalite Creek Drainage and areas near Red Lodge in the Beartooth Mountains.

Reservoirs

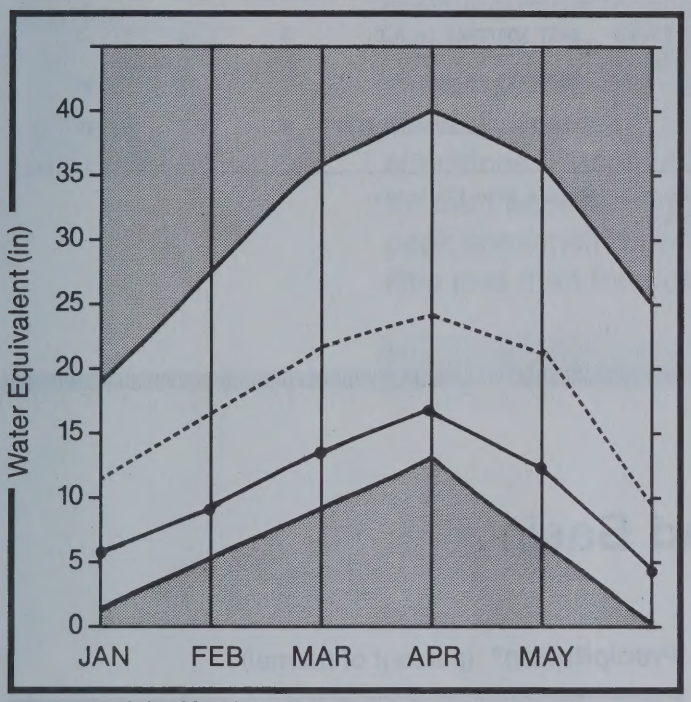
Most reservoirs in northwestern Montana and those in the St. Mary and Milk River system have below average storage. Most other reservoirs across the State have near to above average storage with the exception of Lima Reservoir and most reservoirs in central Montana.

Streamflow

Based on provisional records, May runoff was above average in the Gallatin and Yellowstone River Drainages and 50 to 80 percent of average in other drainages. Most streams west of the Divide, in central Montana and the extreme southwest corner reached peak snowmelt runoff around mid-May. The Big Hole, Gallatin and Bitterroot Rivers peaked near the end of the month. The Yellowstone River and most of its tributaries should peak in early June. Seasonal streamflow on most streams is expected to be about the same or a little less than forecasted on May 1. Shortages in irrigation water supplies are anticipated to develop on most streams by mid to late June. Those with higher elevation headwaters such as the Yellowstone, Gallatin and Bitterroot Rivers could have adequate supplies into early July.

Kootenai Basin

Mountain snowpack* (inches)



*Kootenai in Montana

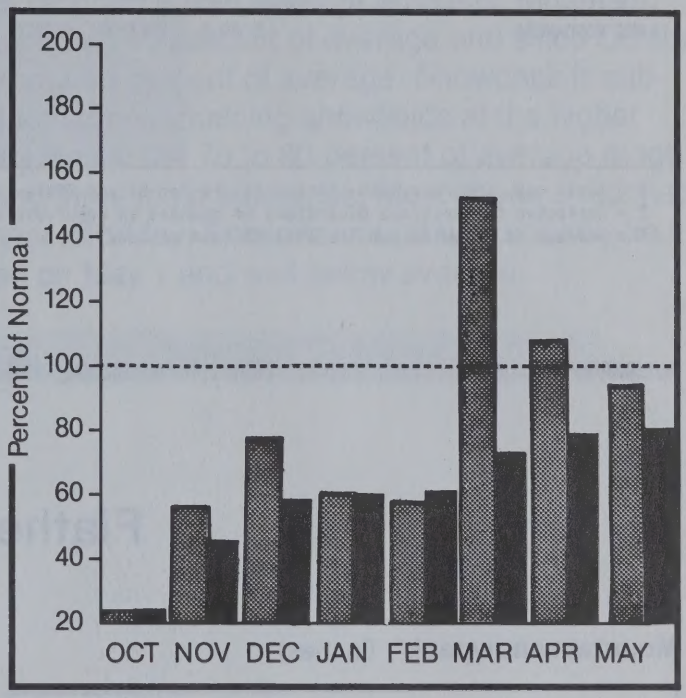
Maximum

Minimum

Average

Current

Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation

Year to date precipitation

Water Supply Outlook

Runoff during May was about 80 percent of average. Most of the smaller tributaries reached peak snowmelt runoff in early May. Mountain precipitation was a little below average in May. Since October 1, the accumulated precipitation is about 80 percent of average. The majority of the snowpack has melted. Streamflows for the remainder of the season are expected to be well below average.

For more information contact your local Soil Conservation office

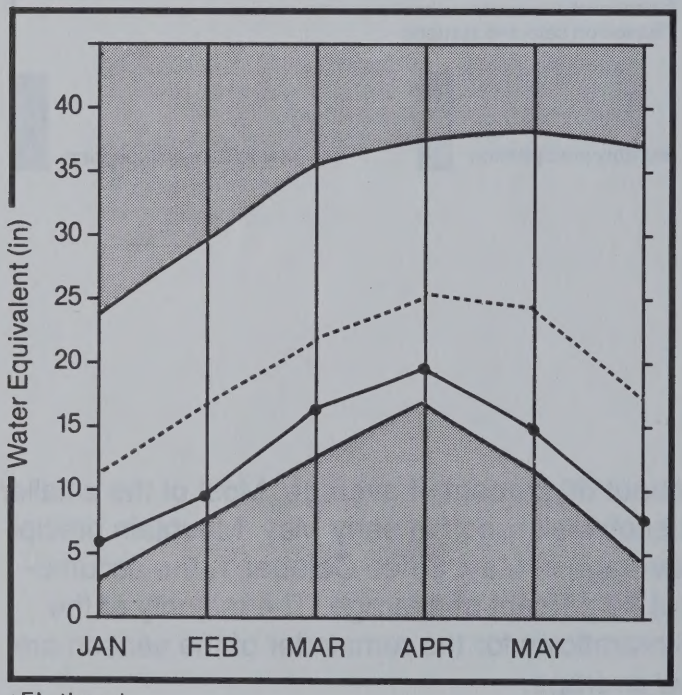
KOOTENAI RIVER BASIN in Montana

RESERVOIR STORAGE (1000AF)					WATERSHED SNOWPACK ANALYSIS			
RESERVOIR	USEABLE CAPACITY	xx USEABLE STORAGE xx THIS YEAR	LAST YEAR	AVG.	WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR.	AVERAGE
LAKE KOOCANUSA	5748.0	2895.0	4553.0	3183.0	EAST KOOTENAI in B.C.	0	0	0
					KOOTENAI in MONTANA	9	151	48
					KOOTENAI ab BONNERS FERRY	8	159	49

1 - Reas. max. and reas. min. forecasts are for 5% and 95% exceedance levels and also (2) below.
2 - Corrected for upstream diversions or changes in reservoir storage.
The average is computed for the 1961-85 base period.

Flathead Basin

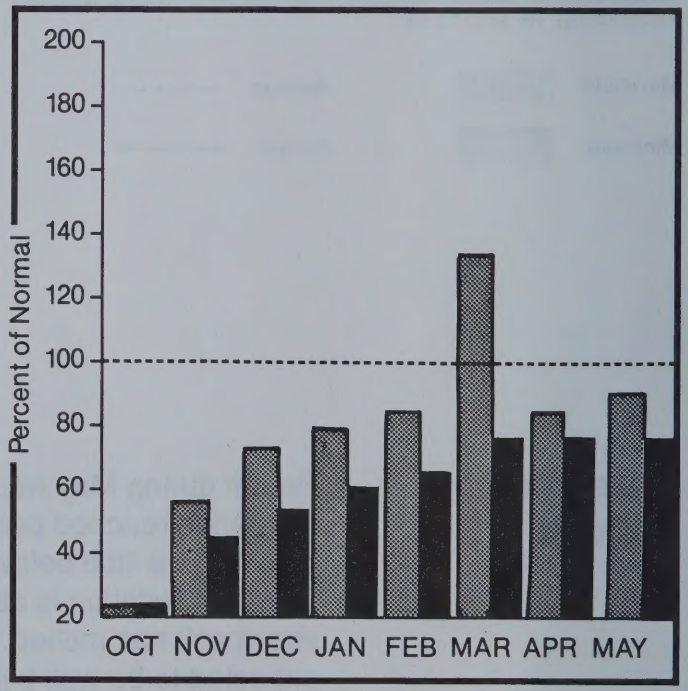
Mountain snowpack* (inches)



*Flathead

Maximum
Minimum
Average
Current

Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation
Year to date precipitation

Water Supply Outlook

Some valley stations reported above average precipitation for May but most mountain locations reported below average amounts. Mountain precipitation for May was about 85 percent of average and since October 1, the accumulation is about 80 percent of average. Snowpack is substantially melted except for some remaining snowfields at the higher elevations. Runoff in May was in the 70 to 80 percent of average range for the Flathead River and three main tributaries. Most streams reached peak snowmelt runoff near mid-May. Seasonal runoff will probably be a little less than forecasted on May 1 and well below average.

For more information contact your local Soil Conservation office

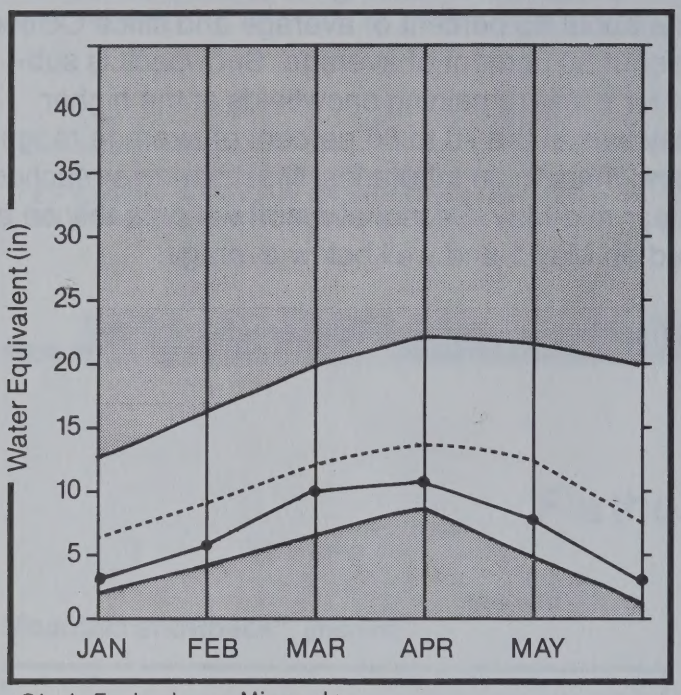
FLATHEAD RIVER BASIN

RESERVOIR STORAGE (1000AF)					WATERSHED SNOWPACK ANALYSIS			
RESERVOIR	USEABLE CAPACITY	** USEABLE STORAGE ** THIS YEAR	LAST YEAR	AVG.	WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR.	AVERAGE
CAMAS (4)	45.2	17.8	31.4	31.3	NORTH FORK FLATHEAD	7	130	45
MISSION VALLEY (8)	100.0	64.8	62.2	67.9	MIDDLE FORK FLATHEAD	4	199	40
HUNGRY HORSE	3451.0	1630.0	3264.0	2663.0	SOUTH FORK FLATHEAD	3	598	40
FLATHEAD LAKE	1791.0	1480.0	1596.0	1468.0	STILLWATER-WHITEFISH	6	144	23
					SWAN	6	320	42
					LITTLE BITTERROOT	2	0	0
					FLATHEAD	18	209	40

1 - Reas. max. and reas. min. forecasts are for 5% and 95% exceedance levels and also (2) below.
2 - Corrected for upstream diversions or changes in reservoir storage.
The average is computed for the 1961-85 base period.

Clark Fork Basin above Missoula

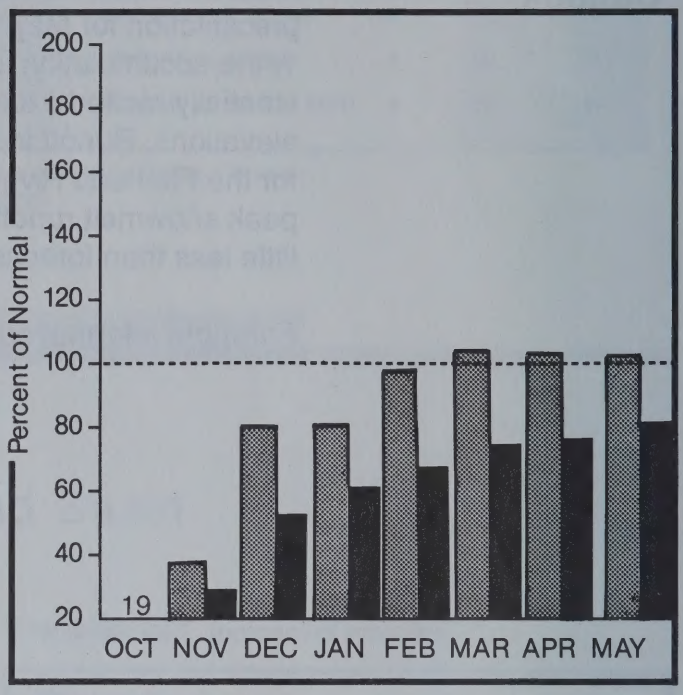
Mountain snowpack* (inches)



*Clark Fork above Missoula

Maximum
Minimum
Average
Current

Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation
Year to date precipitation

Water Supply Outlook

Mountain precipitation was about average across the basin. However, the Clark Fork Drainage was a little above average and the Blackfoot showed a little below average amounts. In general, the valley areas reported May moisture a little below average. Since October 1, total precipitation has been about 80 percent of average. Snowpack is substantially gone for this season. May runoff was about 50 percent of average on the Clark Fork and Blackfoot. Some smaller headwater streams did produce a little better runoff. Most streams reached peak snowmelt runoff the third week in May. It appears runoff may be a little less than forecasted on May 1. Irrigation water shortages are expected to develop by mid to late June and continue through the main irrigation season.

For more information contact your local Soil Conservation office

CLARK FORK RIVER BASIN above Missoula

RESERVOIR STORAGE (1000AF)

RESERVOIR	USEABLE CAPACITY	xx USEABLE STORAGE xx THIS YEAR	LAST YEAR	AVG.
GEORGETOWN LAKE	31.0	30.2	30.6	26.5
LOWER WILLOW CREEK	4.9	3.8	2.4	4.5
NEVADA CREEK	12.6	5.2	6.0	11.6

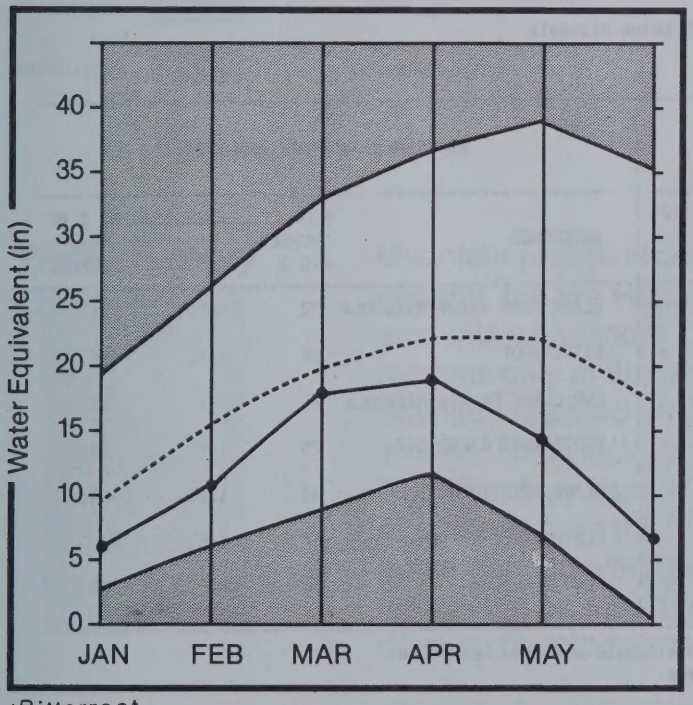
WATERSHED SNOWPACK ANALYSIS

WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR.	AVERAGE
CLARK FORK ab BLACKFOOT	18	0	38
BLACKFOOT	7	1900	22
CLARK FORK above MISSOULA	22	6350	36

1 - Reas. max. and reas. min. forecasts are for 5% and 95% exceedance levels and also (2) below.
2 - Corrected for upstream diversions or changes in reservoir storage.
The average is computed for the 1961-85 base period.

Clark Fork Basin below Missoula

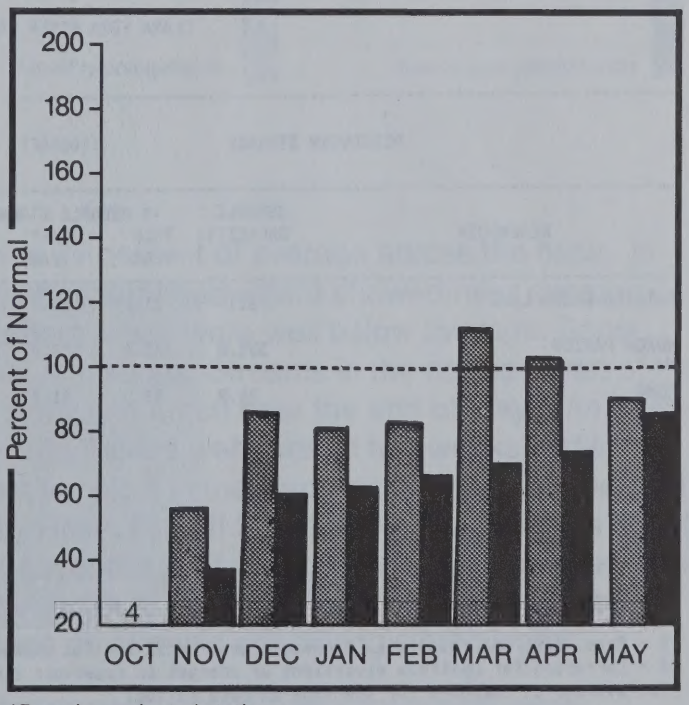
Mountain snowpack* (inches)



*Bitterroot

Maximum
Minimum
Average
Current

Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation
Year to date precipitation

Water Supply Outlook

Mountain precipitation was a little above average in the Bitterroot River Drainage and a little below average in the Lower Clark Fork. Over the basin, mountain precipitation was about 90 percent of average. Only higher elevations have any significant snowpack. The upper areas of the Bitterroot River reached peak snowmelt runoff around May 25. May runoff was about 70 percent of average. Seasonal runoff is expected to be near values forecasted on May 1. Streamflows should hold up until mid-June and will then drop sharply as the snowpacks disappear. Irrigation water supply shortages could develop by mid-June on streams with low elevation headwaters and by early July on those having high elevation headwaters.

For more information contact your local Soil Conservation office

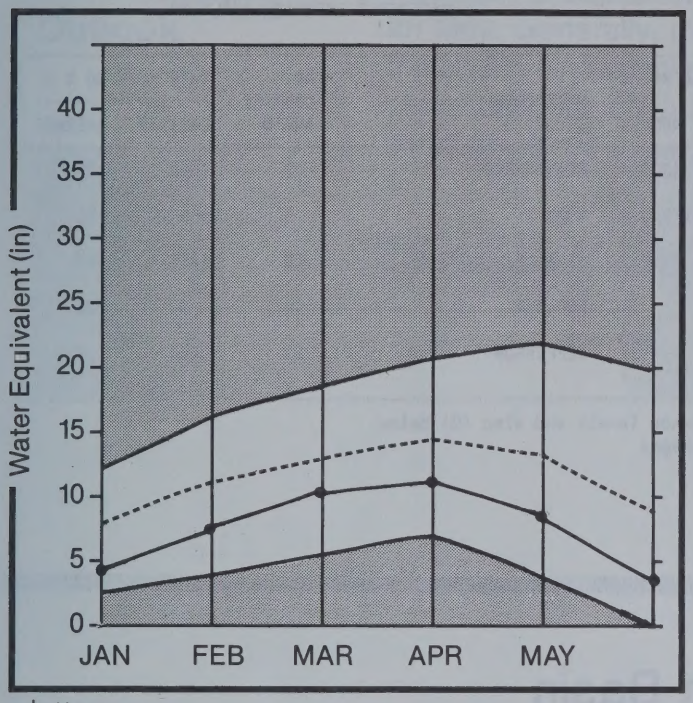
CLARK FORK RIVER BASIN below Missoula

RESERVOIR STORAGE (1000AF)					WATERSHED SNOWPACK ANALYSIS			
RESERVOIR	USEABLE CAPACITY	** USEABLE STORAGE ** THIS YEAR	LAST YEAR	AVG.	WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR.	AVERAGE
PAINTED ROCKS LAKE	31.7	31.7	24.7	30.4	CLARK FORK above MISSOULA	22	6350	36
NOXON RAPIDS	335.0	321.6	328.0	270.4	BITTERROOT	14	6643	37
COMO	34.9	33.5	31.4	28.2	LWR CLARK FK blw MISSOULA	13	823	55
					BITTERROOT & LWR C.F.	25	1097	48
					CLARK FORK TOTAL	45	1352	44
					FLATHEAD	17	198	39
					PEND O'REILLE	58	430	43

1 - Reas. max. and reas. min. forecasts are for 5% and 95% exceedance levels and also (2) below.
2 - Corrected for upstream diversions or changes in reservoir storage.
The average is computed for the 1961-85 base period.

Jefferson Basin

Mountain snowpack* (inches)



*Jefferson

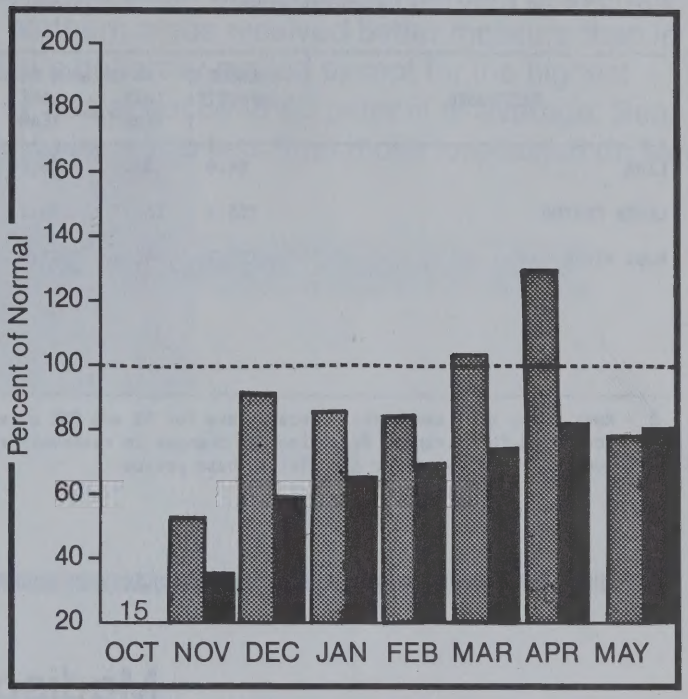
Maximum

Minimum

Average

Current

Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation

Year to date precipitation

Water Supply Outlook

Mountain precipitation was 77 percent of average across the basin. In general, the Big Hole and Boulder headwaters showed near average amounts while more southern areas were well below average. Snow remains only at the higher elevations. Streams in the northern part of the drainage reached peak snowmelt runoff near the end of May. The Beaverhead, Red Rock, and Ruby Rivers were one to two weeks earlier. Runoff in May varied from very low in the Red Rock to about 80 percent of average from the Ruby River. Runoff from the Big Hole River is about 50 percent of average. Seasonal runoff is expected to be a little less than forecasted on May 1. Shortages of irrigation water can be expected to develop by mid to late June on streams not having stored water.

For more information contact your local Soil Conservation office

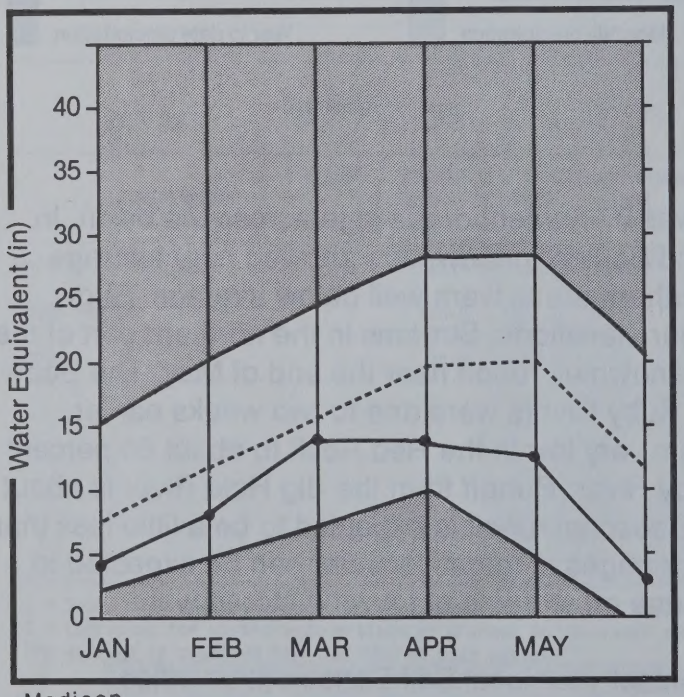
JEFFERSON RIVER BASIN

RESERVOIR STORAGE (1000AF)					WATERSHED SNOWPACK ANALYSIS			
RESERVOIR	USEABLE CAPACITY	xx USEABLE STORAGE xx THIS YEAR	LAST YEAR	AVG.	WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR.	AVERAGE
LIMA	84.0	36.9	56.6	67.0	BEAVERHEAD	12	1000	33
CLARK CANYON	255.6	157.7	154.2	171.0	RUBY	4	463	11
RUBY RIVER	38.8	40.6	32.7	38.0	BIGHOLE	10	1614	43
					BOULDER	4	0	52
					JEFFERSON	23	1652	34

1 - Reas. max. and reas. min. forecasts are for 5% and 95% exceedance levels and also (2) below.
2 - Corrected for upstream diversions or changes in reservoir storage.
The average is computed for the 1961-85 base period.

Madison Basin

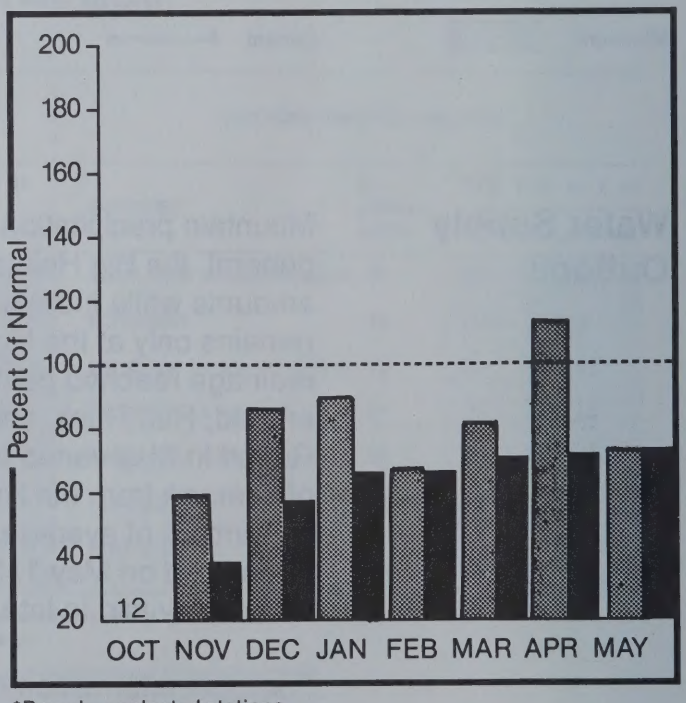
Mountain snowpack* (inches)



*Madison

Maximum
Minimum
Average
Current

Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation
Year to date precipitation

Water Supply Outlook

Mountain precipitation over the basin was about 75 percent of average for May. Generally, the northern areas received better moisture than in the south. Snowpacks have generally melted except for the highest elevations. Runoff in May was about 80 to 85 percent of average. Seasonal flows are expected to be a little less than those forecasted on May 1.

For more information contact your local Soil Conservation office

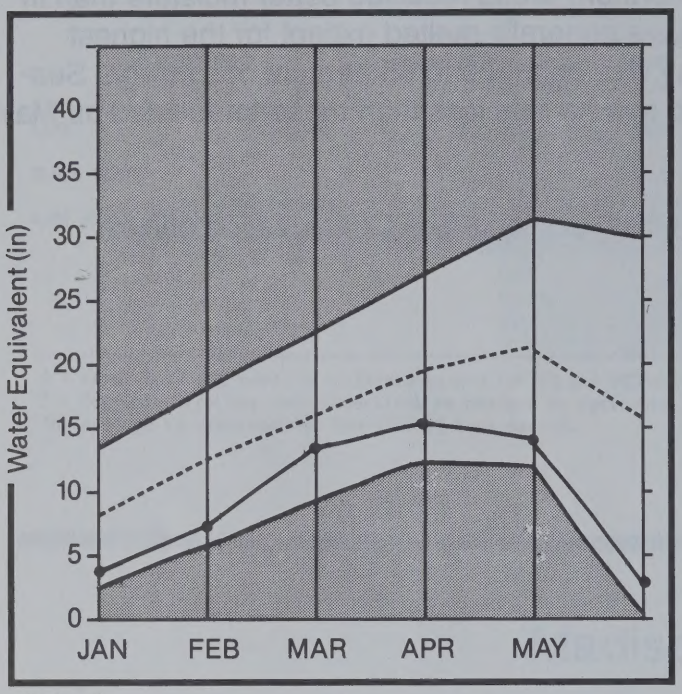
MADISON RIVER BASIN

RESERVOIR STORAGE (1000AF)					WATERSHED SNOWPACK ANALYSIS			
RESERVOIR	USEABLE CAPACITY	** USEABLE STORAGE ** THIS YEAR	LAST YEAR	AVG.	WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR.	AVERAGE
ENNIS LAKE	41.0	37.7	36.0	35.7	MADISON above HEBGEN	4	0	43
HEBGEN LAKE	377.5	342.2	370.7	298.3	LOWER MADISON	6	892	13
					MADISON	10	1975	21

1 - Reas. max. and reas. min. forecasts are for 5% and 95% exceedance levels and also (2) below.
2 - Corrected for upstream diversions or changes in reservoir storage.
The average is computed for the 1961-85 base period.

Gallatin Basin

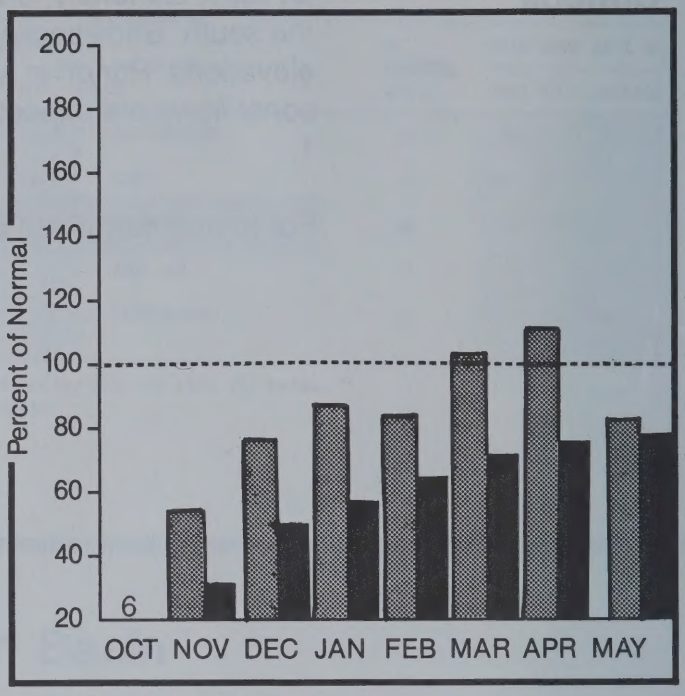
Mountain snowpack* (inches)



*Gallatin

Maximum
Minimum
Average
Current

Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation
Year to date precipitation

Water Supply Outlook

During May, mountain precipitation was above average in the Hyalite Creek Drainage but below average elsewhere. Across the basin, it was about 80 percent of average. Some snow remains above 8000 feet but most will be gone by mid-June. May runoff was a little above average. Seasonal streamflows on the Upper Gallatin River are expected to be a little less than forecasted on May 1. Hyalite Creek and the Lower Gallatin could be a little above earlier forecasts. Water shortages could develop by late June or early July on higher elevation headwater streams and possibly earlier on streams with low elevation headwaters.

For more information contact your local Soil Conservation office

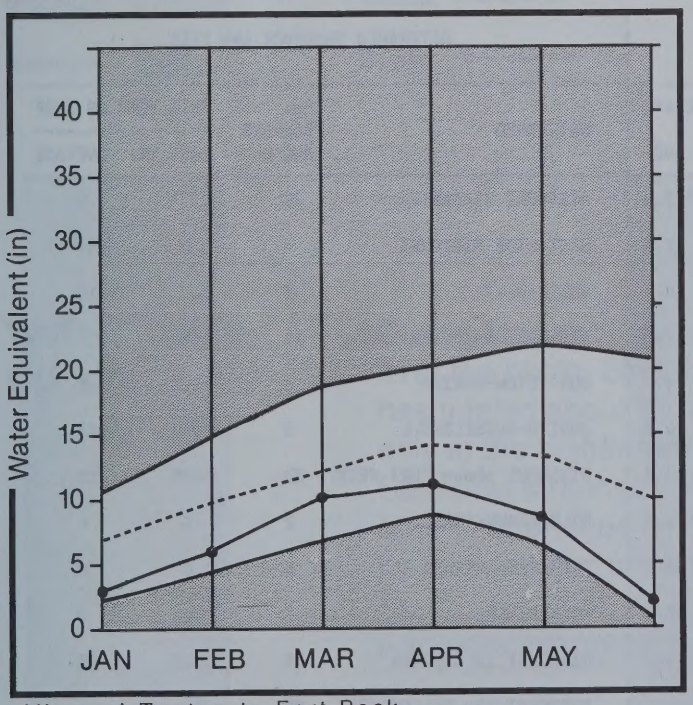
GALLATIN RIVER BASIN

RESERVOIR STORAGE (1000AF)					WATERSHED SNOWPACK ANALYSIS			
RESERVOIR	USEABLE CAPACITY	** USEABLE STORAGE ** THIS YEAR	LAST YEAR	AVG.	WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR.	AVERAGE
MIDDLE CREEK	8.0	8.0	8.3	6.8	UPPER GALLATIN	4	2813	31
					EAST GALLATIN	6	1722	22
					GALLATIN	9	1731	19

1 - Reas. max. and reas. min. forecasts are for 5% and 95% exceedance levels and also (2) below.
2 - Corrected for upstream diversions or changes in reservoir storage.
The average is computed for the 1961-85 base period.

Missouri Basin

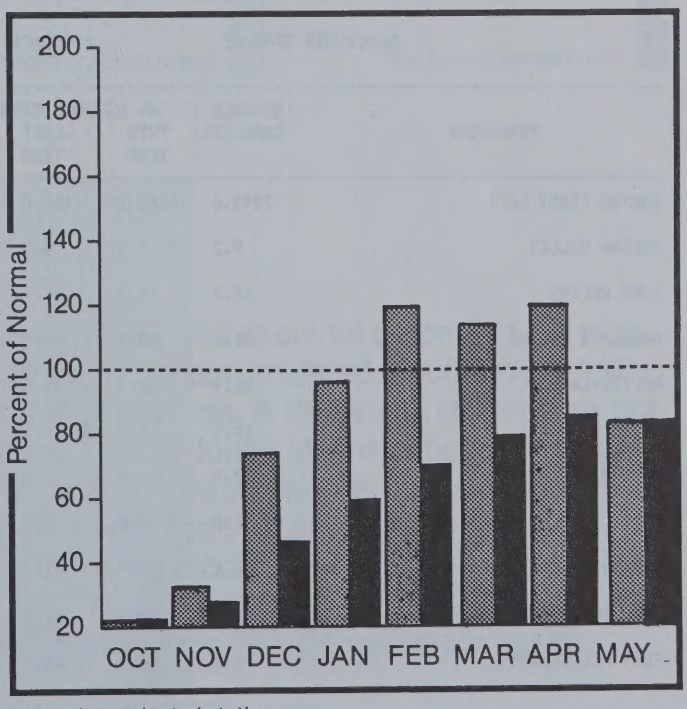
Mountain snowpack* (inches)



*Missouri Toston to Fort Peck

Maximum
Minimum
Average
Current

Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation
Year to date precipitation

Water Supply Outlook

Mountain precipitation was variable across the basin. Precipitation amounts were above average in the Snowy Mountains and below average in the Little Belt and Big Belt Mountains. Most of the areas reported about 85 percent of average. Very little snow remains in the watershed under 8000 feet. Most streams reached peak snowmelt runoff around mid-May. Seasonal runoff is expected to be a little less than the amounts forecasted on May 1. On streams not having stored water, shortages of irrigation water are anticipated to begin developing by mid-June.

For more information contact your local Soil Conservation office

MISSOURI RIVER BASIN

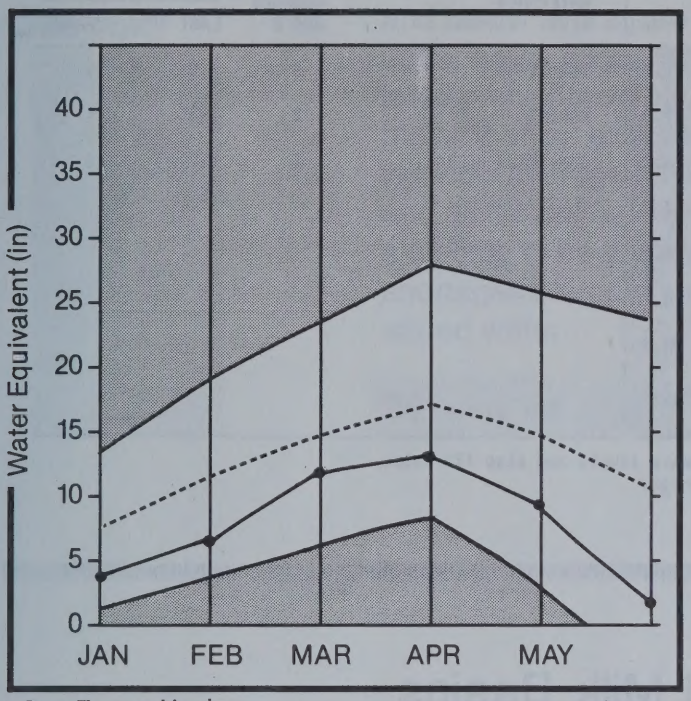
RESERVOIR STORAGE (1000AF)					WATERSHED SNOWPACK ANALYSIS			
RESERVOIR	USEABLE CAPACITY	** USEABLE STORAGE ** THIS YEAR	LAST YEAR	AVG.	WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR.	AVERAGE
CANYON FERRY LAKE	2043.0	1682.0	1608.0	1672.0	MISSOURI HEADWATERS	36	1957	29
HELENA VALLEY	9.2	6.1	8.3	7.5	WEST SIDE MISSOURI	4	0	49
LAKE HELENA	10.4	10.9	10.7	10.0	SMITH-BELT	7	810	15
HAUSER & HELENA	61.9	63.1	62.5	60.5	MISSOURI MAINSTEM	11	2380	27
HOLTER LAKE	81.9	80.5	81.0	74.9	SUN-TETON-MARIAS	6	1825	16
SMITH RIVER	10.6	6.7	9.5	10.8	JUDITH-MUSSELSHELL	8	2040	17
NEWLAN CREEK	12.4	9.4	10.6	10.6	MISSOURI above FORT PECK	53	1805	25
BAIR	7.0	2.8	5.4	6.4	MILK HEADWATERS	2	0	0
MARTINSDALE	23.1	8.9	11.4	17.4	BEAR PAW	5	0	0
DEADMAN'S BASIN	72.2	38.1	51.9	57.4	MILK RIVER	7	0	0
FORT PECK LAKE*	18.9	14.7	16.2	15.7	MISSOURI in MONTANA	59	1805	25
					MISSOURI blw YELLOWSTONE	98	718	35

*Millon Acre Feet

1 - Reas. max. and reas. min. forecasts are for 5% and 95% exceedance levels and also (2) below.
2 - Corrected for upstream diversions or changes in reservoir storage.
The average is computed for the 1961-85 base period.

Sun, Teton and Marias Basins

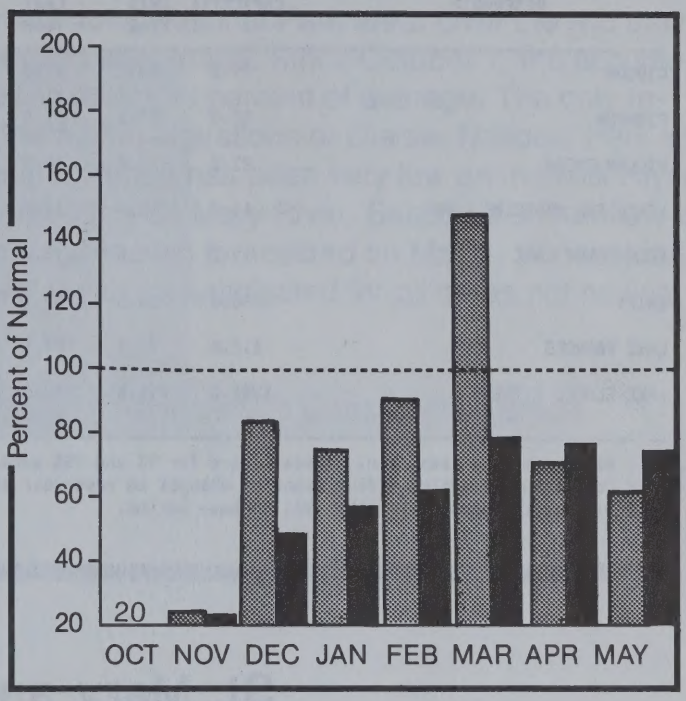
Mountain snowpack* (inches)



*Sun-Teton-Marias

Maximum
Minimum
Average
Current

Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation
Year to date precipitation

Water Supply Outlook

During May, mountain precipitation was about 60 percent of average over the basin. Since October 1, the accumulated mountain precipitation has totaled about 75 percent of average. A little snow still remains but only at the higher elevations. Runoff during May was below average. Seasonal streamflow is expected to be a little less than forecasted on May 1. Shortages of irrigation water can be expected to begin occurring by mid-June on streams not having stored water.

For more information contact your local Soil Conservation office

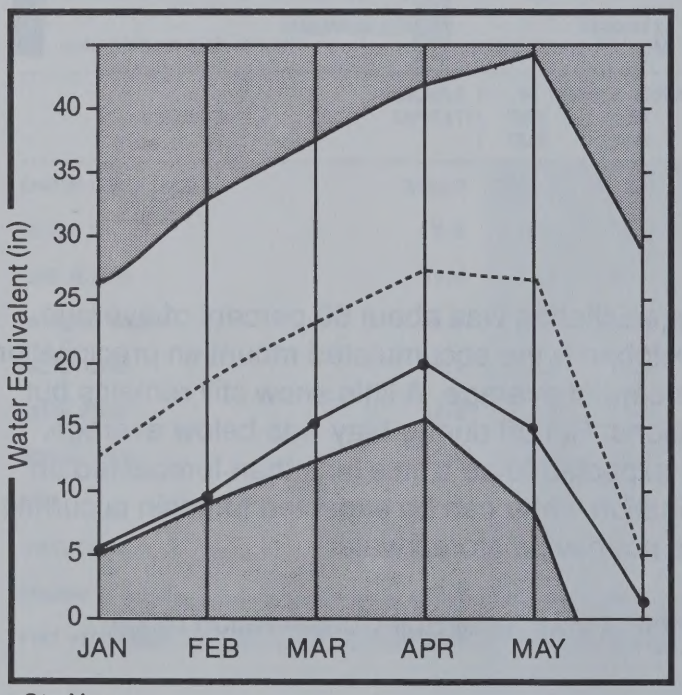
SUN-TETON-MARIAS RIVER BASINS

RESERVOIR STORAGE (1000AF)					WATERSHED SNOWPACK ANALYSIS			
RESERVOIR	USEABLE CAPACITY	** USEABLE STORAGE ** THIS YEAR	LAST YEAR	AVG.	WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR.	AVERAGE
GIBSON	99.1	86.5	99.0	90.2	SUN-TETON	4	0	0
PISHKUN	32.0	27.5	31.4	29.0	MARIAS	2	1825	21
WILLOW CREEK	32.2	29.8	32.7	28.0	SUN-TETON-MARIAS	6	1825	16
LOWER TWO MEDICINE LAKE	11.9	12.5	12.5	12.4				
FOUR HORNS LAKE	19.2	13.0	13.9	13.2				
SWIFT	30.0	26.5	30.1	24.5				
LAKE FRANCES	112.0	93.0	104.1	85.4				
LAKE ELWELL (TIBER)	1347.0	741.8	840.1	662.6				

1 - Reas. max. and reas. min. forecasts are for 5% and 95% exceedance levels and also (2) below.
2 - Corrected for upstream diversions or changes in reservoir storage.
The average is computed for the 1961-85 base period.

St. Mary and Milk Basins

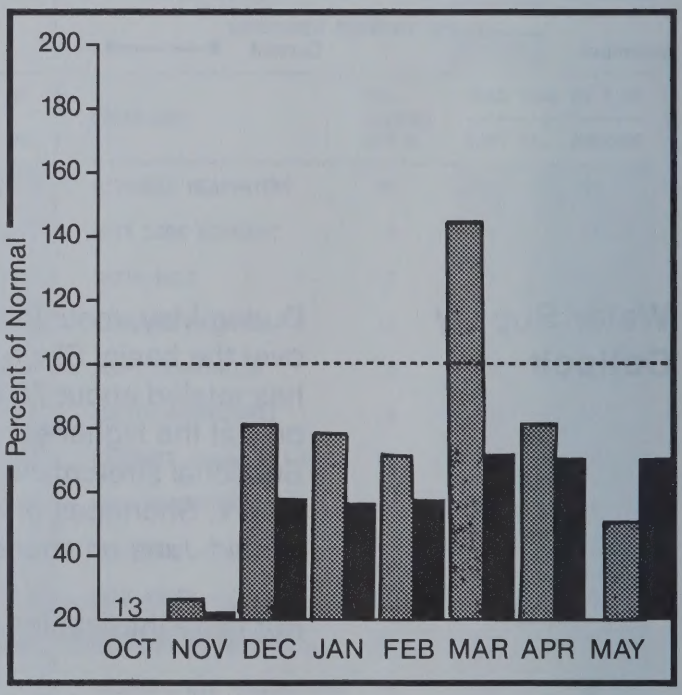
Mountain snowpack* (inches)



*St. Mary

Maximum
Minimum
Average
Current

Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation
Year to date precipitation

Water Supply Outlook

May precipitation was well below average in the Bear Paw Mountains and below average in the Glacier National Park area. Over the two drainages, it was about 50 percent of average. Since October 1, the accumulated precipitation has been about 70 percent of average. The only remaining snow exists at the higher elevations of Glacier National Park and is below average for June 1. Runoff has been very low on the Milk River and a little below average on the St. Mary River. Seasonal streamflow is expected to be somewhat lower than forecasted on May 1. Widespread shortages of irrigation water can be anticipated for all areas not having stored water.

For more information contact your local Soil Conservation office

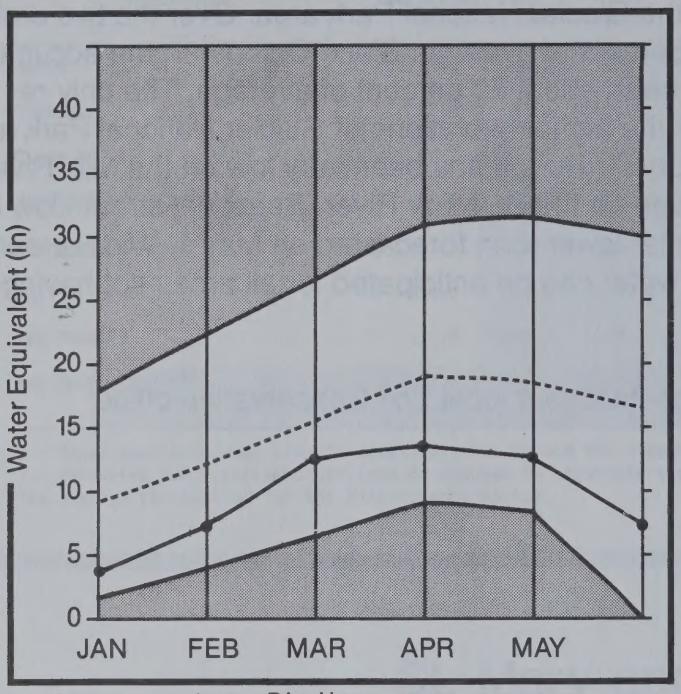
ST. MARY and MILK RIVER BASINS

RESERVOIR STORAGE (1000AF)					WATERSHED SNOWPACK ANALYSIS			
RESERVOIR	USEABLE CAPACITY	** USEABLE STORAGE ** THIS YEAR	LAST YEAR	AVG.	WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR.	AVERAGE
LAKE SHERBURNE	64.3	15.9	64.6	30.3	MILK HEADWATERS	2	0	0
FRESNO	127.0	60.8	92.4	89.4	BEAR PAW	5	0	0
BEAVER CREEK	3.5	2.6	3.3	3.2	MILK RIVER	7	0	0
NELSON	66.8	28.6	57.2	41.7	ST. MARY	3	154	43
					ST. MARY and MILK	8	154	41
					BOW RIVER in ALBERTA	0	0	0
					OLDMAN RIVER in ALBERTA	0	0	0

1 - Reas. max. and reas. min. forecasts are for 5% and 95% exceedance levels and also (2) below.
2 - Corrected for upstream diversions or changes in reservoir storage.
The average is computed for the 1961-85 base period.

Yellowstone Basin

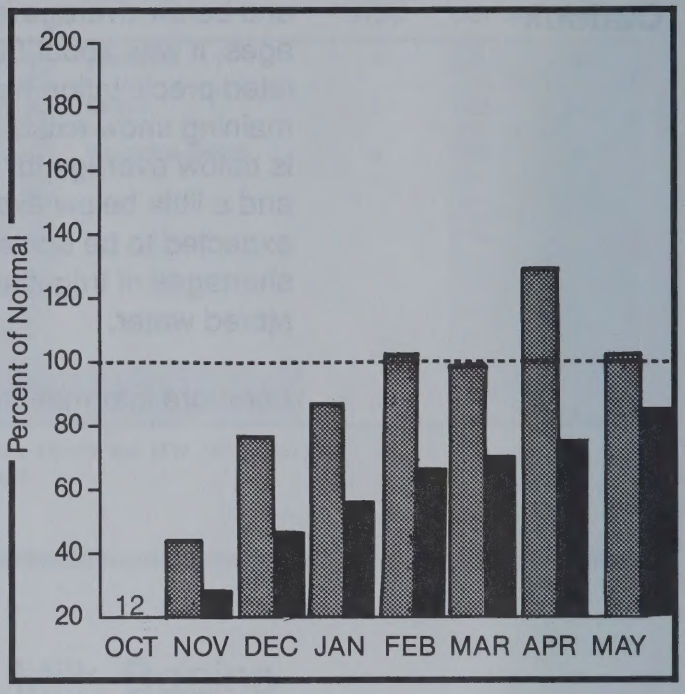
Mountain snowpack* (inches)



*Yellowstone above Big Horn

Maximum
Minimum
Average
Current

Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation
Year to date precipitation

Water Supply Outlook

Across the basin, May precipitation was about average. However, areas near Red Lodge reported above average amounts. Snow at the higher elevations is about one-half the normal for this time of year. Runoff during May was above average reflecting considerable melt for the month and heavy precipitation around Memorial Day weekend. Peak snowmelt runoff occurred in early June on the Yellowstone River and most tributaries. Seasonal streamflows are still expected to be near values forecasted on May 1. On streams with lower elevation headwaters, shortages in irrigation water could develop by mid to late June. Those with higher elevation headwaters should have adequate water until early or mid-July.

For more information contact your local Soil Conservation office

YELLOWSTONE RIVER BASIN

RESERVOIR STORAGE (1000AF)					WATERSHED SNOWPACK ANALYSIS			
RESERVOIR	USEABLE CAPACITY	xx USEABLE STORAGE xx THIS YEAR	LAST YEAR	AVG.	WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR.	AVERAGE
MYSTIC LAKE	21.0	11.0	12.4	5.2	YELLOWSTONE ab LIVINGSTON	10	632	55
COONEY	27.4	24.5	28.2	19.1	SHIELDS	6	500	4
BIGHORN LAKE	1356.0	973.9	858.4	749.2	BOULDER-STILLWATER	3	1361	75
TONGUE RIVER	68.0	65.6	59.8	47.7	CLARK'S FORK-ROCK CREEK	12	1005	57
					YELLOWSTONE above BIGHORN	24	925	45
					LITTLE BIGHORN	2	980	49
					WIND RIVER (Wyoming)	11	251	34
					BIGHORN RIVER (Wyoming)	15	421	35
					BIGHORN BASIN (Total)	23	332	39
					TONGUE RIVER (Wyoming)	5	820	26
					POWDER RIVER (Wyoming)	7	0	6
					YELLOWSTONE RIVER	48	563	41

1 - Reas. max. and reas. min. forecasts are for 5% and 95% exceedance levels and also (2) below.
2 - Corrected for upstream diversions or changes in reservoir storage.
The average is computed for the 1961-85 base period.

Snow Data Measurements

May 15, 1988

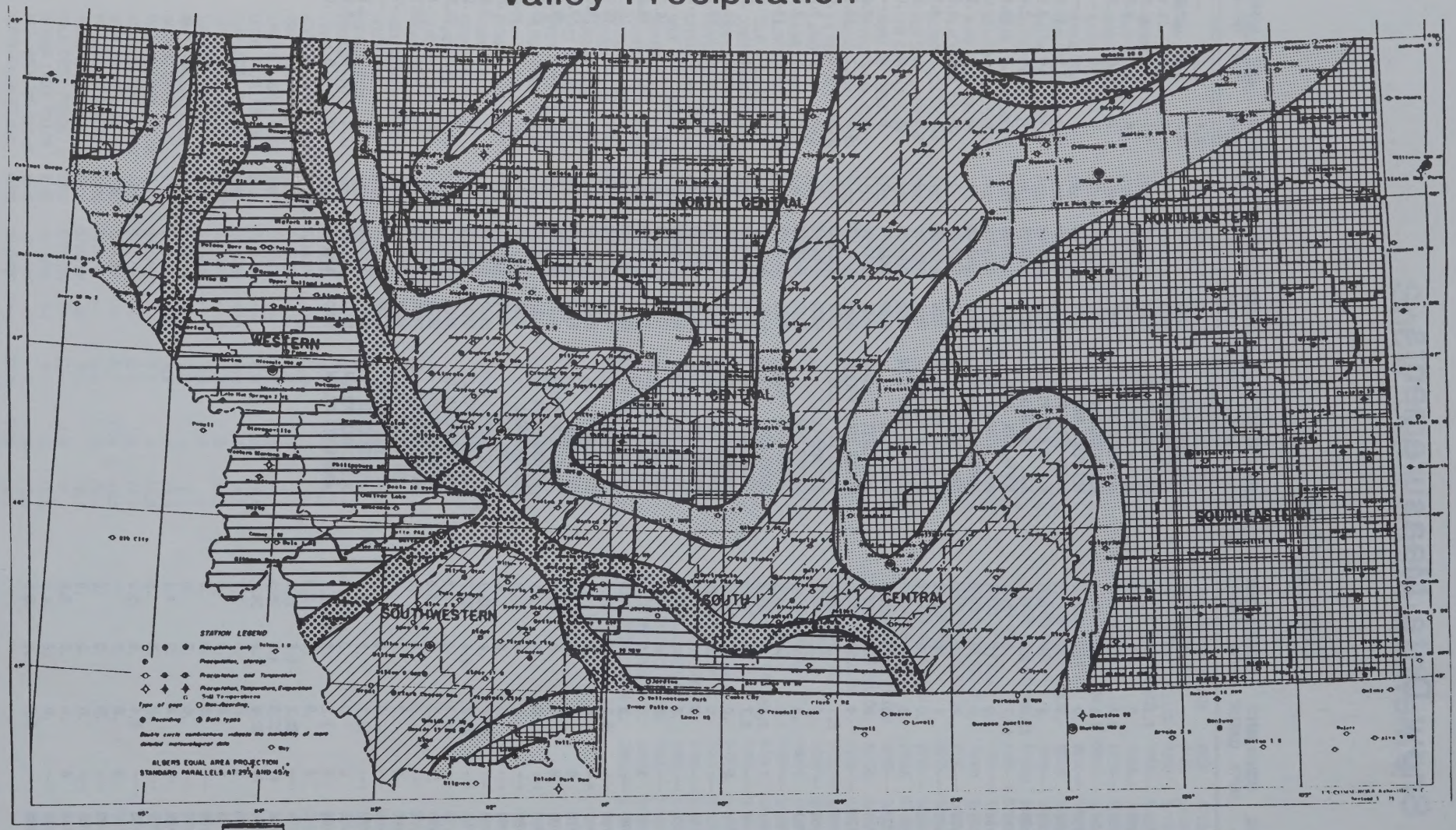
SNOW COURSE	ELEVATION	DATE	SNOW DEPTH	WATER CONTENT	LAST YEAR	AVERAGE 1961-85
MONTANA						
BADGER PASS PILLOW	6900	5/15/88	---	24.1	8.0	36.9
BANFIELD MTN PILLOW	5600	5/15/88	---	2.1	.0	13.1
BAREE CREEK	5500	5/12/88	45	21.7	9.4	39.0
BAREE MIDWAY	4600	5/12/88	21	9.8	2.6	22.5
BAREE TRAIL	3800	5/12/88	0	.0	.0	.0
BARKER LAKES PILLOW	8250	5/15/88	---	13.5	.0	15.8
BASIN CREEK PILLOW	7180	5/15/88	---	7.5	.0	9.6
BEAGLE SPGS PILLOW	8850	5/15/88	---	1.9	.0	4.9
BEAR PAW SKI AREA	5200	5/14/88	0	.0	.0	--
BEAVER CREEK PILLOW	7850	5/15/88	---	11.4	.0	21.7
BLACK BEAR PILLOW	7950	5/15/88	---	30.2	.3	35.9
BLACK PINE PILLOW	7100	5/15/88	---	6.3	.0	10.8
BLOODY DICK PILLOW	7550	5/15/88	---	1.8	.0	6.4
BOULDER MTN PILLOW	7950	5/15/88	---	10.7	.0	21.0
BOX CANYON PILLOW	6700	5/15/88	---	.0	.0	1.5
BOXELDER CREEK	5100	5/14/88	0	.0	.0	--
BRIDGER BOWL PILLOW	7250	5/16/88	---	16.2	.0	26.7
BRIDGER BOWL	7250	5/16/88	38	19.1	.0	28.7
CALVERT CREEK PILLOW	6430	5/15/88	---	.0	.0	.1
CARROT BASIN PILLOW	9000	5/15/88	---	20.1	3.0	31.9
CASHE CREEK PILLOW	7800	5/15/88	---	5.1	.0	8.1
CLOVER MEADOW PILLOW	8800	5/15/88	---	13.7	.0	17.4
COLE CREEK PILLOW	7850	5/15/88	---	19.1	2.0	20.2
COMBINATION PILLOW	5600	5/15/88	---	.0	.0	.5
COPPER BOTTOM PILLOW	5200	5/15/88	---	.0	.0	1.4
COPPER CAMP PILLOW	6950	5/15/88	---	16.1	.0	28.1
CRYSTAL LAKE PILLOW	6050	5/15/88	---	4.9	.0	8.7
DALY CREEK PILLOW	5780	5/15/88	---	.0	.0	2.3
DARKHORSE LK. PILLOW	8700	5/15/88	---	24.3	5.2	28.2
DEADMAN CREEK PILLOW	6450	5/15/88	---	.0	.0	2.8
DISCOVERY BASIN	7050	5/11/88	21	8.0	.0	8.8
DIVIDE PILLOW	7800	5/15/88	---	6.5	.0	8.7
DUPUYER CREEK PILLOW	5750	5/15/88	---	.0	.0	1.0
EAST BOULDER S	9250	5/16/88	60	25.0	5.0	33.1
EMERY CREEK PILLOW	4350	5/15/88	---	.0	.0	1.6
FISHER CREEK PILLOW	9100	5/15/88	---	30.8	7.6	38.8
FLATTOP MTN PILLOW	6300	5/15/88	---	30.7	25.4	46.7
FROHNER MDWS PILLOW	6480	5/15/88	---	2.7	.0	6.3
GIBBONS PASS	7100	5/16/88	15	7.4	.0	18.9
GRAVE CRK PILLOW	4300	5/15/88	---	.0	.0	2.6
HAND CREEK PILLOW	5030	5/15/88	---	.0	.0	3.4
HAWKINS LAKE PILLOW	6450	5/15/88	---	23.7	8.8	28.4
HEART LAKE TRAIL	4800	5/14/88	7	3.2	.0	10.7
HELL ROARING DIVIDE	5770	5/16/88	24	10.4	7.6	24.8
HOODOO BASIN PILLOW	6050	5/15/88	---	30.6	17.0	44.0
HOODOO BASIN	6050	5/14/88	70	36.5	15.0	48.7
HOODOO CREEK	5900	5/14/88	67	32.4	12.7	45.1
KINGS HILL	7500	5/13/88	23	9.6	.0	14.7
KIWANIS CAMP	3720	5/14/88	0	.0	.0	--
KRAFT CREEK PILLOW	4750	5/15/88	---	.0	.0	1.4
LAKEVIEW RDG. PILLOW	7400	5/15/88	---	.0	.0	5.1
LEMHI RIDGE PILLOW	8100	5/15/88	---	6.0	.0	8.1
LICK CREEK PILLOW	6860	5/15/88	---	6.0	.0	4.9
LOWER TWIN PILLOW	7900	5/15/88	---	14.8	.3	22.3
LUBRECHT PILLOW	4680	5/15/88	---	.0	.0	.0
MANY GLACIER PILLOW	4900	5/15/88	---	.0	.0	1.1
MAYNARD CREEK	6210	5/16/88	9	3.8	.0	12.0
MAYNARD CREEK PILLOW	6210	5/16/88	---	5.2	.0	10.9
MONUMENT PEAK PILLOW	8850	5/15/88	---	19.0	1.6	24.4
MOSS PEAK PILLOW	6780	5/15/88	---	25.2	15.4	44.3
MT LOCKHART PILLOW	6400	5/15/88	---	13.6	.2	20.4
MOUNT LOCKHART	6400	5/16/88	22	9.2	--	18.7
MULE CREEK PILLOW	8300	5/15/88	---	13.7	1.2	16.1
NEVADA CREEK PILLOW	6480	5/15/88	---	8.1	.0	11.4
NEZ PERCE CMP PILLOW	5650	/ 5/88	15	.7	.0	5.3
NOISY BASIN PILLOW	6040	5/15/88	---	23.9	14.2	43.0
N.F. ELK CR PILLOW	6250	5/15/88	---	.0	.0	6.8
NORTH FORK JOCKO	6330	5/13/88	49	26.0	4.3	41.5
N.E. ENTRANCE PILLOW	7350	5/15/88	---	.0	.0	2.9
NORTHEAST ENTRANCE	7350	5/13/88	0	.0	.0	4.1
PICKET PIN D	9450	5/16/88	51	20.5	1.5	28.5
PICKFOOT CRK PILLOW	6650	5/15/88	---	.0	.0	3.1
PIKE CREEK PILLOW	5930	5/15/88	---	7.5	.0	20.6
PLACER BASIN F	8830	5/16/88	44	17.5	1.0	22.9
PLACER BASIN PILLOW	8830	5/15/88	---	25.4	5.5	20.1
RED MOUNTAIN	6000	5/13/88	14	5.0	.0	14.2
ROCKER PEAK PILLOW	8000	5/15/88	---	16.5	2.9	18.3
ROCKY BOY	4700	5/14/88	0	.0	.0	.7
ROCKY BOY PILLOW	4700	5/14/88	---	.0	.0	1.0
SADDLE MTN PILLOW	7900	5/15/88	---	18.4	.0	26.8
SHOWER FALLS PILLOW	8100	5/15/88	---	27.5	3.2	29.2
SILVER RUN	6630	5/13/88	0	.0	.0	2.3
SILVER RUN PILLOW	6630	5/15/88	---	.0	.0	.0
SKALKAHO PILLOW	7260	5/15/88	---	19.6	2.1	24.2
SKYLARK TRAIL PILLOW	6200	5/15/88	---	16.7	.0	29.7
S.F. SHIELDS PILLOW	8100	5/15/88	---	19.2	.0	20.9
SPUR PARK PILLOW	8100	5/15/88	---	17.6	.5	22.7
STAHL PEAK PILLOW	6030	5/15/88	---	22.1	27.1	39.8
STAR LAKE E	9650	5/16/88	84	35.5	12.5	49.1
SUCKER CREEK	3960	5/14/88	0	.0	.0	--
TAYLOR ROAD	4080	5/14/88	0	.0	.0	--
TEPEE CREEK PILLOW	8000	5/15/88	---	7.2	.0	12.2
TWELVEMILE PILLOW	5600	5/15/88	---	.0	.0	6.6
TWIN LAKES PILLOW	6400	5/15/88	---	27.0	8.4	38.9
WALDRON PILLOW	5600	5/15/88	---	.0	.0	2.9
WEST YELL'ST PILLOW	6700	5/19/88	---	.0	.0	1.6
WEST YELLOWSTONE	6700	5/19/88	0	.0	.0	--
WHISKEY CREEK PILLOW	6800	5/15/88	---	3.5	.0	10.0
WHITE MILL PILLOW	8700	5/15/88	---	21.5	2.0	26.2
WOOD CREEK PILLOW	5960	5/15/88	---	.0	.0	4.1

Snow Data Measurements

June 1, 1988

SNOW COURSE	ELEVATION	DATE	SNOW DEPTH	WATER CONTENT	LAST YEAR	AVERAGE 1961-85
MONTANA						
BADGER PASS PILLOW	6900	6/01/88	---	7.3	.4	22.8
BANFIELD MTN PILLOW	5600	6/01/88	---	.0	.0	3.3
BARKER LAKES PILLOW	8250	6/01/88	---	3.7	.3	10.1
BASIN CREEK PILLOW	7180	6/01/88	---	1.1	.0	6.0
BEAGLE SPGS PILLOW	8850	6/01/88	---	.0	.0	1.1
BEAR PAW SKI AREA	5200	5/27/88	0	.0	.0	1.0
BEAVER CREEK PILLOW	7850	6/01/88	---	.3	.0	18.1
BIG CREEK	6750	5/27/88	43	23.8	11.3	43.7
BLACK BEAR PILLOW	7950	6/01/88	---	12.7	.0	26.1
BLACK PINE PILLOW	7100	6/01/88	---	1.0	.0	3.4
BLACK PINE	7100	5/26/88	0	.0	.0	3.9
BLOODY DICK PILLOW	7550	6/01/88	---	.0	.0	1.0
BOULDER MTN PILLOW	7950	6/01/88	---	.0	.5	11.6
BOX CANYON PILLOW	6700	6/01/88	---	.0	.0	.0
BOXELDER CREEK	5100	5/27/88	0	.0	.0	--
BRIDGER BOWL PILLOW	7250	6/01/88	---	.0	.1	17.4
BRIDGER BOWL	7250	6/01/88	0	.0	.4	21.0
CALVERT CR PILLOW	6430	6/01/88	---	.4	.0	.0
CARROT BASIN PILLOW	9000	6/01/88	---	6.7	.2	26.6
CASHE CREEK PILLOW	7800	6/01/88	---	.0	.2	4.2
CHICKEN CREEK	4060	5/26/88	0	.0	.0	.0
CLOVER MDW PILLOW	8800	6/01/88	---	1.0	.0	11.1
COLE CREEK	7850	5/31/88	7	2.4	.0	19.6
COLE CREEK PILLOW	7850	6/01/88	---	2.7	.0	14.3
COMBINATION	5600	5/26/88	0	.0	.0	.3
COMBINATION PILLOW	5600	6/01/88	---	.0	.0	.0
COPPER BOTTOM PILLOW	5200	6/01/88	---	.0	.0	.1
COPPER CAMP PILLOW	6950	6/01/88	---	.3	.0	13.7
CRYSTAL LAKE PILLOW	6050	6/01/88	---	.0	.0	1.0
DALY CREEK	5780	5/31/88	3	.9	.0	--
DALY CREEK PILLOW	5780	6/01/88	---	.3	.0	.0
DARKHORSE LK. PILLOW	8700	6/01/88	---	16.2	1.9	24.4
DEADMAN CR PILLOW	6450	6/01/88	---	.0	.0	.1
DEADMAN CREEK	6450	5/27/88	0	.0	.0	.4
DISCOVERY BASIN	7050	5/26/88	0	0	.0	5.7
DIVIDE PILLOW	7800	6/01/88	---	0	.0	1.9
DUPUYER CREEK PILLOW	5750	6/01/88	---	.0	.0	.0
EMERY CREEK PILLOW	4350	6/01/88	---	.0	.0	.0
FISHER CREEK PILLOW	9100	6/01/88	---	23.8	.4	33.3
FLATTOP MTN PILLOW	6300	6/01/88	---	22.2	14.4	38.7
FROHNER MDWS PILLOW	6480	6/01/88	---	.0	.0	1.8
GIBBONS PASS	7100	5/31/88	12	1.2	.0	9.8
GRAVE CRK PILLOW	4300	6/01/88	---	.0	.0	.0
HAND CREEK	5030	5/31/88	0	.0	.0	.0
HAND CREEK PILLOW	5030	6/01/88	---	.0	.0	.0
HAWKINS LAKE PILLOW	6450	6/01/88	---	12.7	.0	20.4
HEART LAKE TRAIL	4800	5/27/88	0	.0	.0	2.7
HELL ROARING DIVIDE	5770	6/01/88	6	2.2	.0	12.7
HERRIG JUNCTION	4850	5/26/88	0	.0	.0	2.3
HOODOO BASIN PILLOW	6050	6/01/88	---	20.2	6.5	30.7
HOODOO BASIN	6050	5/27/88	41	22.6	4.5	35.0
HOODOO CREEK	5900	5/27/88	40	20.8	2.8	34.7
KINGS HILL	7500	5/27/88	0	.0	.0	9.7
KIWANIS CAMP	3720	5/27/88	0	.0	.0	--
KRAFT CREEK PILLOW	4750	6/01/88	---	.0	.0	.0
LAKEVIEW RDG. PILLOW	7400	6/01/88	---	.0	.3	.0
LEMHI RIDGE PILLOW	8100	6/01/88	---	.4	.0	4.2
LICK CREEK PILLOW	6860	6/01/88	---	.0	.0	.5
LOWER TWIN PILLOW	7900	6/01/88	---	2.4	.8	15.2
LUBRECHT FLUME	4680	6/03/88	0	.0	.0	--
LUBRECHT PILLOW	4680	6/01/88	---	.6	.0	.0
MANY GLACIER PILLOW	4900	6/01/88	---	.0	.0	.0
MAYNARD CREEK	6210	6/01/88	0	.0	.0	3.9
MAYNARD CR PILLOW	6210	6/01/88	---	.0	.0	4.0
MONUMENT PK PILLOW	8850	6/01/88	---	9.2	.1	16.6
MOSS PEAK	6780	5/27/88	39	19.2	10.6	--
MOSS PEAK PILLOW	6780	6/01/88	---	16.0	4.8	32.3
MT LOCKHART PILLOW	6400	6/01/88	---	.0	.0	11.1
MULE CREEK PILLOW	8300	6/01/88	---	5.1	.0	11.3
NEVADA CREEK PILLOW	6480	6/01/88	---	.4	.0	6.5
NEZ PERCE CMP PILLOW	5650	6/01/88	---	.2	.0	.3
NEZ PERCE CAMP	5650	5/30/88	0	.0	.0	--
NEZ PERCE PASS	6570	5/30/88	3	.4	--	--
NOISY BASIN PILLOW	6040	6/01/88	---	13.3	3.3	31.4
N.F. ELK CR PILLOW	6250	6/01/88	---	1.4	.0	3.5
N.F. ELK CREEK	6250	6/03/88	1	.7	.0	2.4
NORTH FORK JOCKO	6330	5/26/88	19	10.6	.7	28.4
N.E. ENTRANCE PILLOW	7350	6/01/88	---	.0	.0	.0
NORTHEAST ENTRANCE	7350	6/02/88	0	.0	.0	.5
OPHIR PARK	7150	5/28/88	0	.0	.0	8.8
PETERSON MDW PILLOW	7200	6/01/88	---	1.2	.0	4.3
PETERSON MEADOWS	7200	6/01/88	6	1.3	.0	1.3
PICKFOOT CRK PILLOW	6650	6/01/88	---	.4	.0	.0
PIKE CREEK	5930	5/31/88	0	.0	.0	--
PIKE CREEK PILLOW	5930	6/01/88	---	.0	.0	12.6
PLACER BASIN PILLOW	8830	6/01/88	---	15.3	1.7	16.2
PORCUPINE PILLOW	6500	6/01/88	---	.0	.0	.0
RED MOUNTAIN	6000	6/01/88	0	.0	.0	4.7
ROCKER PEAK	8000	5/25/88	11	5.1	.0	9.1
ROCKER PEAK PILLOW	8000	6/01/88	---	10.2	.0	14.4
ROCKY BOY	4700	5/27/88	0	.0	.0	.4
ROCKY BOY PILLOW	4700	6/01/88	---	.0	.0	.3
SADDLE MTN PILLOW	7900	6/01/88	---	7.8	.0	19.8
SHOWER FALLS PILLOW	8100	6/01/88	---	15.5	.4	23.7
SILVER RUN	6630	5/31/88	0	.0	.0	.9
SILVER RUN PILLOW	6630	6/01/88	---	.0	.0	.0
SKALKAHO PILLOW	7260	6/01/88	---	9.2	.0	16.2
SKALKAHO SUMMIT	7250	5/31/88	15	3.8	.0	15.6
SKYLARK TRAIL PILLOW	6200	6/01/88	---	.6	.0	16.5
S.F. SHIELDS PILLOW	8100	6/01/88	---	2.5	.0	15.6
SPUR PARK PILLOW	8100	6/01/88	---	3.1	.3	16.5
SPUR PARK	8100	5/27/88	10	4.6	.2	17.5
STAHL PEAK PILLOW	6030	6/01/88	---	16.4	16.0	29.9
STRYKER BASIN	6180	5/26/88	11	6.0	5.7	21.1
SUCKER CREEK	3960	5/27/88	0	.0	.0	.2
TAYLOR ROAD	4080	5/27/88	0	.0	.0	.5
TEPEE CREEK PILLOW	8000	6/01/88	---	.3	.0	5.6
TWELVEMILE PILLOW	5600	6/01/88	---	.0	.0	.6
TWIN LAKES PILLOW	6400	6/01/88	---	15.5	.3	28.6
WALDRON PILLOW	5600	6/01/88	---	.0	.0	.1
WARM SPRINGS PILLOW	7800	6/01/88	---	13.6	.0	25.7
WEST YELL'ST PILLOW	6700	6/01/88	---	.0	.0	.0
WEST YELLOWSTONE	6700	6/01/88	0	.0	.0	--
WHISKEY CREEK PILLOW	6800	6/01/88	---	.0	.0	1.2
WHITE MILL PILLOW	8700	6/01/88	---	12.2	.0	19.9
WOOD CREEK PILLOW	5960	6/01/88	---	.0	.0	.0

Valley Precipitation



Over 130%

110 - 130%

90 - 110%

70 - 90%

Under 70%

MAY 1988

Source: NWS
Great Falls, MT

The Following Organizations Cooperate With The Soil Conservation Service In Snow Survey Work

Canadian

Department of the Environment
- Atmospheric Environment Service
- Water Management Service

British Columbia Ministry of Environment
- Inventory and Engineering Branch, Hydrology Section

Alberta Environment
- Technical Services Division

Federal

U.S. Department of Agriculture
- Forest Service

U.S. Department of the Army
- Corps of Engineers

U.S. Department of Commerce
- NOAA, National Weather Service
- National Environmental Satellite Service

U.S. Department of the Interior
- Bureau of Indian Affairs
- Fish and Wildlife Service
- Geological Survey
- National Park Service
- Bureau of Reclamation

U.S. Department of Energy
- Bonneville Power Administration

State

Montana Conservation Districts
Montana Department of Fish, Wildlife, and Parks
Montana Department of Natural Resources and Conservation
Montana Department of State Lands
Montana State University - Agricultural Experiment Station
University of Montana - School of Forestry

Private

Big Sky of Montana
Butte Water Company
Confererated Salish & Kootenai Tribes
Flathead Valley Comminity College
Montana Power Company
Pondera County Canal & Reservoir Company

Other organizations and individuals furnish information for the snow survey reports.
Their cooperation is gratefully acknowledged.

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SOIL CONSERVATION SERVICE
SNOW SURVEY UNIT
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